

1637

PROCEEDINGS 34TH YEAR

JOURNAL
OF THE
AMERICAN WATER WORKS
ASSOCIATION

VOLUME I
1914

BALTIMORE, MD.
THE WAVERLY PRESS
1914

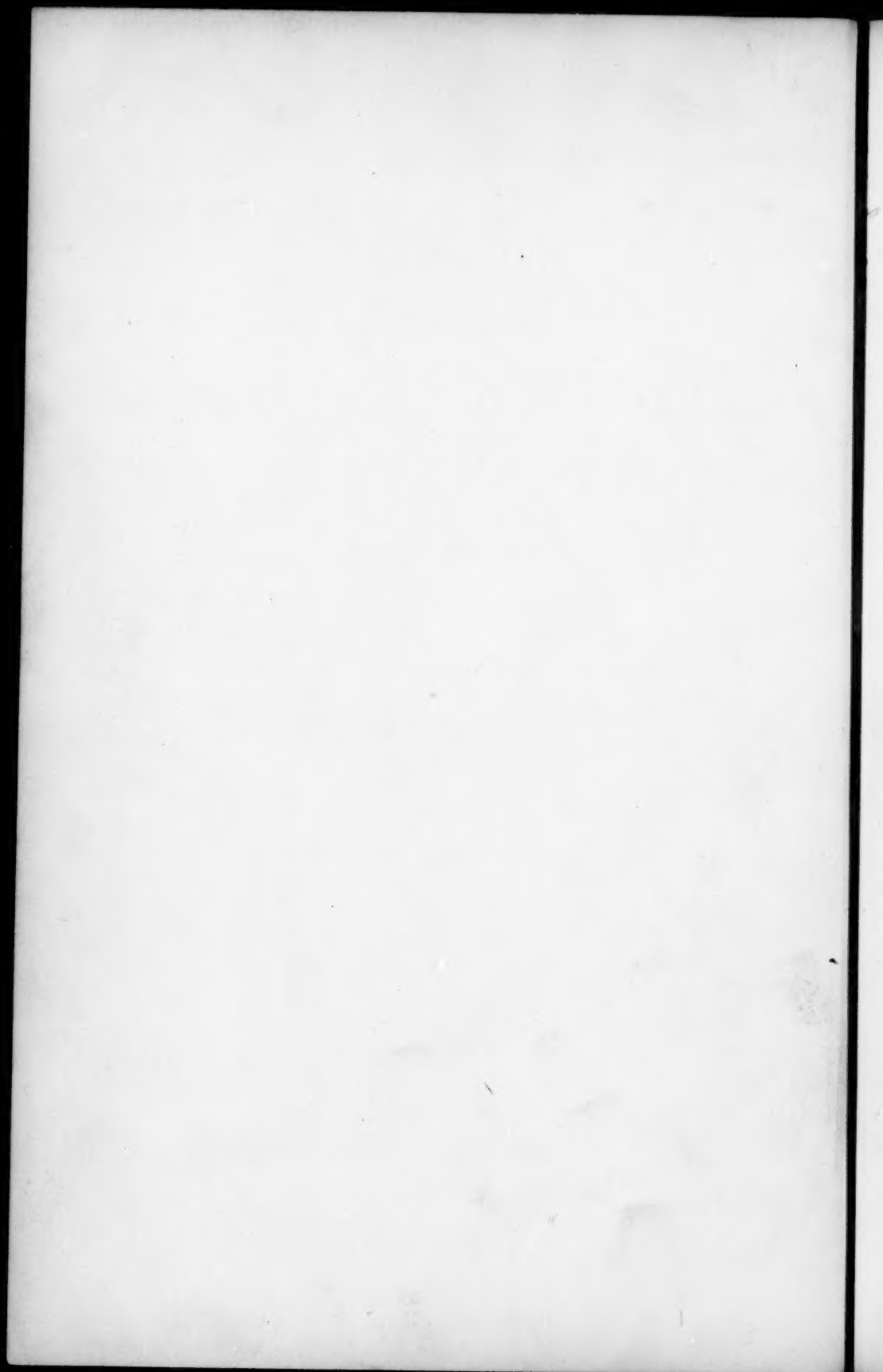


TABLE OF CONTENTS.

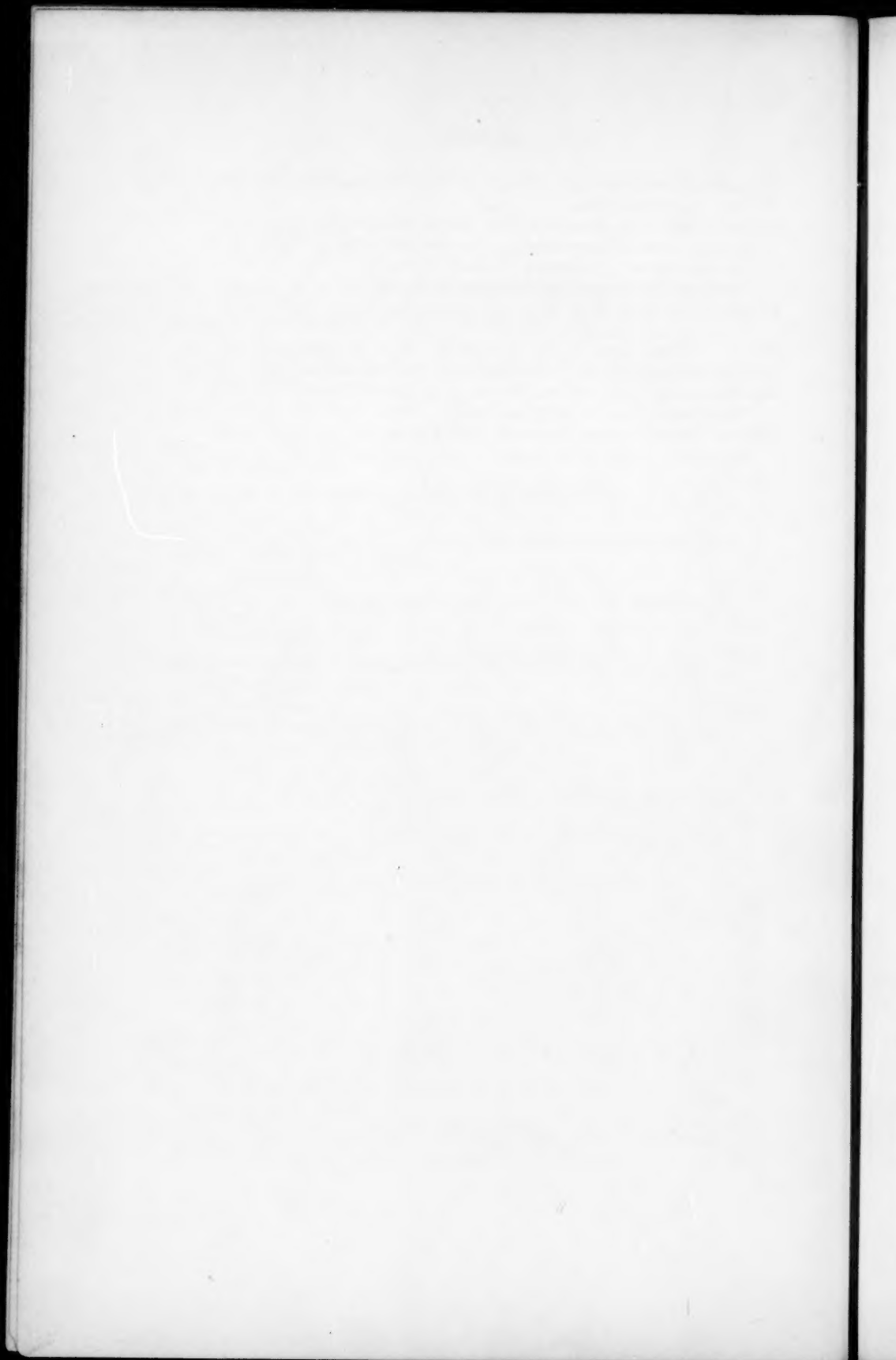
| | |
|--|---------|
| Foreword..... | 1 |
| Changes in Membership..... | 3 |
| Philadelphia Convention..... | 6 |
| The Sections..... | 7 |
| INVESTIGATION INTO THE ADVISABILITY OF SUBSTITUTING AGAR FOR GEL- ATINE AS A MEDIUM FOR THE DETERMINATION OF BACTERIAL COUNTS IN WATER ANALYSIS. By W. U. C. Baton. | 11 |
| SEWAGE POLLUTION OF BOUNDARY WATERS. By Allan J. McLaughlin.... | 24 |
| PRESENT DAY WATER FILTRATION PRACTICE. By George A. Johnson.... | 31 |
| REMARKS ON THE THEORY OF THE PITOT TUBE. By N. W. Akimoff..... | 81 |
| TESTING OF CHECK VALVES. By J. Walter Ackerman..... | 90 |
| EQUITABLE HYDRANT RENTALS AND BETTER METHODS FOR APPORTION- ING FIRE PROTECTION COST. By John W. Alvord..... | 95 |
| USE AND BENEFITS OF PRESSURE RECORDING GAGES. By J. M. Diven... 103 | |
| THE WATER SUPPLY AT WILMINGTON, DELAWARE. By Edgar M. Hoopes, Jr., and James M. Caird. | 111 |
| THE CROTON WATER SUPPLY: ITS QUALITY AND PURIFICATION. By George W. Fuller..... | 135 |
| Members Joined Since Last Issue..... | 189 |
| In Memoriam..... | 193 |
| Attendance at Philadelphia Convention..... | 193 |
| Exhibitors at Philadelphia Convention..... | 193 |
| 1915 Convention..... | 194 |
| Minutes of Proceedings 34th Annual Convention American Water Works Association..... | 195 |
| Report of Committee on Tabulation of Water Rates and other informa- tion of interest to Water Companies..... | 231 |
| GRAVITY WATER SUPPLY IN THE CITY OF MANILA, PHILIPPINE ISLANDS. By H. E. Keeler..... | 338 |
| USE OF CONCRETE IN WATER WORKS CONSTRUCTION. By Edgar B. Kay. 345 | |
| BRIEF REVIEW OF SEWAGE DISPOSAL WORKS IN SOME EUROPEAN CITIES AND COMPARISON WITH THE PENNYPACK CREEK WORKS AT PHILADEL- PHIA. By George E. Datesman..... | 359 |
| A WANDERER'S NOTES ON FOREIGN WATER SUPPLIES. By Louis L. Tri- bus..... | 384 |
| DISINFECTING 200,000,000 GALLONS OF WATER A DAY. EXPERIENCE WITH CHLORIDE OF LIME AND LIQUID CHLORINE AT TORRESDALE FILTRA- TION PLANT. By Francis D. West..... | 403 |
| Discussion..... | 446-455 |
| Discussion on the Croton Water Supply, its Quality and Purification. (Paper by George W. Fuller)..... | 456-463 |

| | |
|---|---------|
| Discussion on Present Day Water Filtration Practice. (Paper by George A. Johnson)..... | 466-509 |
| Discussion on the Investigation into the Advisability of Substituting Agar for Gelatine as a Medium for the Determination of Bacterial Counts in Water Analysis. (Paper by W. U. C. Baton)..... | 523-526 |
| Discussion on Sewage Pollution of Boundary Waters. (Paper by Dr. Allan J. McLaughlin)..... | 528-535 |
| Discussion on Remarks on the Theory of the Pitot Tube. (Paper by N. W. Akimoff)..... | 536 |
| Discussion on Equitable Hydrant Rentals and a Better Method for Apportioning Fire Protection Costs. (Paper by John W. Alvord)..... | 538-545 |
| Discussion on Testing of Check Valves. (Paper by J. Walter Ackerman)..... | 546-548 |
| Discussion on Use and Benefits of Pressure Recording Gages. (Paper by J. M. Diven)..... | 549-550 |
| FIRE ALARM ATTACHMENT FOR RECORDING PRESSURE GAGE. By W. E. Haseltine..... | 551 |
| CONSERVATION OF POTABLE WATER AND THE DUAL SYSTEM OF DISTRIBUTION. By Henry C. Hodgkins..... | 554 |
| Discussion..... | 558-563 |
| PURIFICATION OF WATER BY THE ULTRA-VIOLET RAYS. By M. von Recklinghausen. | 565 |
| Discussion..... | 585-586 |
| THE EFFICIENCY OF HOUSEHOLD FILTERS IN CHICAGO. By Arthur Lederer and Frank Bachman..... | 589 |
| Discussion..... | 600-601 |
| THE USE OF NITRITE TEST IN DETERMINING SOURCE OF POLLUTION OF A WATER SUPPLY. By William Miller Booth..... | 602 |
| Discussion..... | 611 |
| DIAGRAMMATIC METHOD OF DETERMINING THE COST PER FOOT OF CAST IRON PIPE. By W. E. Miller..... | 612 |
| THE INDIVIDUALITY OF PUBLIC UTILITIES, NOTABLY WATER WORKS. By W. E. Miller..... | 614 |
| SOME OBSERVATIONS OF THE EFFECT OF OZONE ON ALGAE GROWTHS. By S. T. Powell..... | 629 |
| Question Box..... | 637 |
| General Discussion of Water Works Topics..... | 682 |
| HOUSE TO HOUSE INSPECTIONS. By A. Prescott Folwell..... | 685 |
| LEGAL DECISION IN A WATER SUPPLY POLLUTION CASE. By J. Walter Ackerman..... | 688 |
| Discussion..... | 692 |
| AN UNDEVELOPED FIELD IN WATER WORKS MANAGEMENT. By Paul Hansen..... | 694 |
| Discussion on the Individuality of Public Utilities Notably Water Works. (Paper by W. E. Miller)..... | 696 |
| Discussion on Equitable Hydrant Rentals and Better Methods for Apportioning Fire Protection Costs. (Paper by John W. Alvord)..... | 697 |

CONTENTS

v

| | |
|--|-----|
| FORTY-EIGHT INCH CAST IRON FORCE MAIN FOR ATLANTIC CITY, NEW JERSEY. By L. Van Gilder..... | 704 |
| NOTES ON THE CONTAMINATION OF A DRINKING AND RAILROAD WATER SUPPLY BY SEA WATER AND THE REMOVAL OF THE SALT WATER FROM THE RESERVOIR. By John R. Downes..... | 709 |
| THE GROWING VALUE OF GROUND WATER SUPPLIES. By L. J. LeConte.. | 715 |
| A CHEAP HOMEMADE TEST PLUG FOR WATER MAINS. By W. E. Haseltine. | 717 |
| PUSHING SERVICE PIPES UNDER PAVEMENTS. By F. C. Amsbary..... | 719 |
| LABORATORY CONTROL OF WATER SUPPLIES. By Edward Bartow..... | 720 |
| SOME RELATIONS BETWEEN THE WATER SUPPLY AND TYPHOID FEVER AT WASHINGTON, D. C. By John Gaub..... | 727 |
| NOTE ON ORTHO-TOLIDIN TEST FOR FREE CHLORINE. By W. F. Montfort..... | 734 |



LIST OF ILLUSTRATIONS.

THE THEORY OF THE PITOT TUBE

| | |
|--|----|
| Stream Lines and Velocities of a Jet Impinging on a Plate..... | 82 |
| Diagram—Stream Impinging on Plate..... (inset following) | 84 |
| Nozzles..... | 85 |
| Jet Acting on Plate in Front of Orifice..... | 86 |

TESTING OF CHECK VALVES

| | |
|----------------------------------|----|
| Diagrammatic Representation..... | 91 |
|----------------------------------|----|

WATER SUPPLY OF WILMINGTON, DELAWARE

| | |
|---|-----|
| Air Wash Manifold of One Preliminary Filter Bed..... | 116 |
| Filtered Water Reservoir..... | 119 |
| Van Buren Street Bridge and Aqueduct..... | 120 |
| Administration Building and Slow Sand Filtration Plant..... | 121 |
| 12,000,000 Gallon Pumping Engine..... | 122 |
| Wm. T. Porter Reservoir..... | 127 |
| Brandywine Pumping Station..... | 127 |
| Filter Sand Washing Machine..... | 130 |
| Preliminary Filter Building..... | 132 |

THE CROTON WATER SUPPLY: ITS QUALITY AND PURIFICATION

| | |
|---|-----|
| Map of Route of New Croton Aqueduct..... (folder following) | 136 |
| Croton Water Shed, Areas of Sub-divisions..... (folder following) | 136 |
| Water Storage and Consumption..... (diagram) | 139 |
| Quality of Croton Water 1911..... (folder following) | 140 |
| Quality of Croton Water 1912..... (folder following) | 140 |
| Quality of Croton Water..... (diagram) | 147 |
| Quality of Croton Water..... (diagram) | 150 |
| Quality of Croton Water..... (diagram) | 151 |
| Site of Filter Plant..... | 159 |
| Filter Site..... (map and folder following) | 160 |
| Topography of Filter Site..... (folder following) | 160 |
| General Arrangement of Filter Plant..... (folder following) | 164 |
| Gate Chamber No. 8..... (folder following) | 164 |
| Section of Filter and Filter Gallery..... (folder following) | 164 |
| South Elevation of Filter House..... | 165 |

SEWAGE DISPOSAL WORKS IN EUROPEAN CITIES

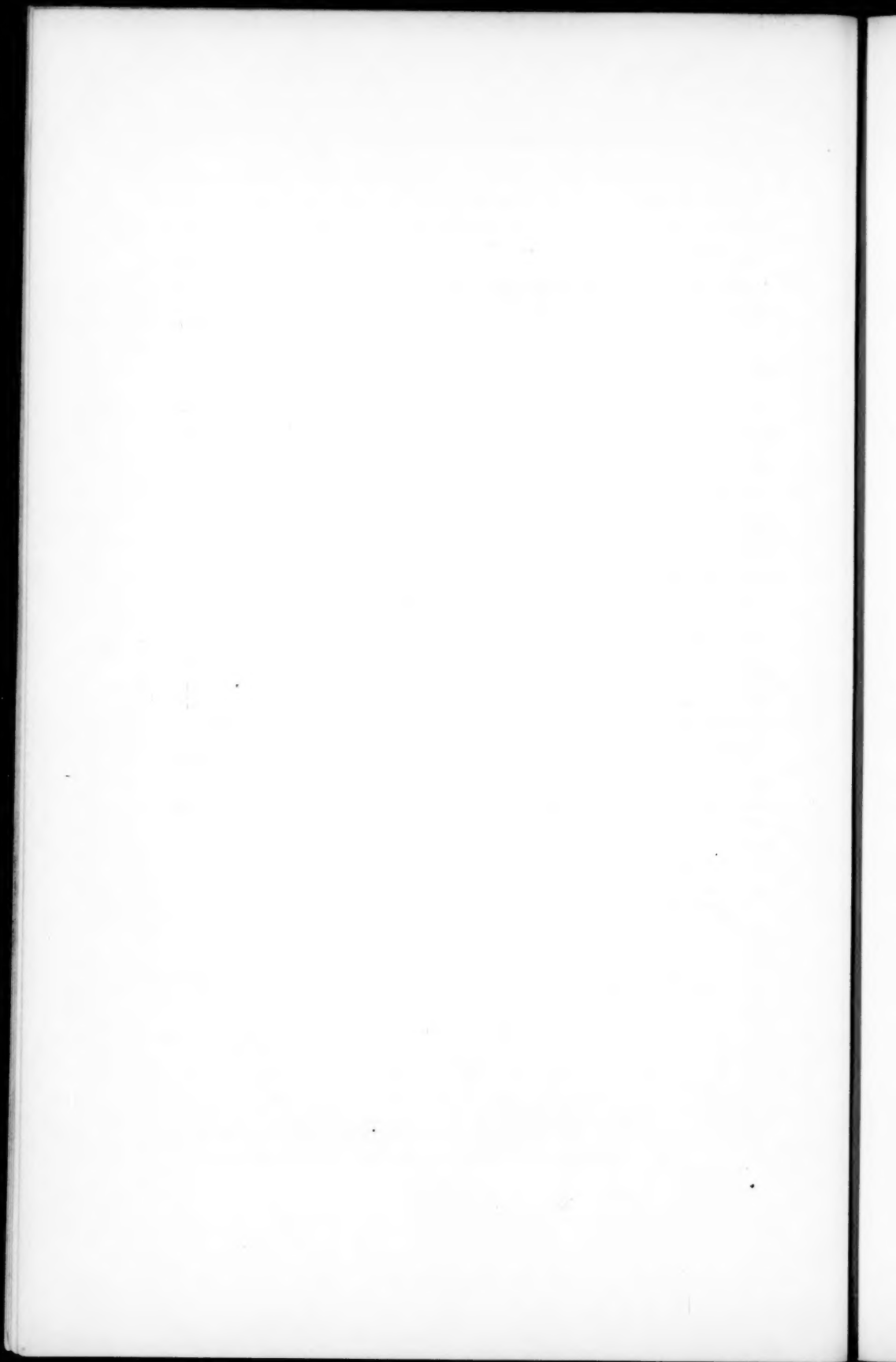
| | |
|--|-----|
| Fine Rakes or Screens at Frankfurt a. Main..... | 364 |
| Fine Screens of Reinsch Type, Dresden, Germany..... | 365 |
| Emscher Tanks Showing Proximity of Buildings, Sewage Disposal Works at Essen-Nord, Germany..... | 366 |
| Percolating Filters at Wilmersdorf, Germany..... | 368 |
| Contact Beds at Sheffield, England..... | 370 |
| Silt Tanks and Percolating Filters at Birmingham, England..... | 372 |

SEWAGE DISPOSAL WORKS IN EUROPEAN CITIES—*Continued*

| | |
|---|-----|
| Pennypack Creek Sewage Purification Works: Plan of Sedimentation Tanks, Basin and Percolating Filters..... | 376 |
| Pennypack Creek Sewage Disposal Works, Philadelphia, Pa., (sectional diagram) | 377 |
| Operating Mechanism, Controlling Distribution on Percolating Filters, Pennypack Creek Works..... | 378 |
| Percolating Filters, Pennypack Creek Works..... | 380 |
| Diagrammatic History of Pennypack Creek Works 1913 (folder following) | 380 |
| Plan for the Collection, Treatment and Disposal of Sewage, Philadelphia, Pa..... (folder following) | 382 |
| A WANDERER'S NOTES ON FOREIGN WATER SUPPLIES | |
| Raising Water by the Shadoof, Along the Nile, Egypt..... | 385 |
| Sakyieh, Animal Power, Egypt..... | 386 |
| English Irrigation Pumping Station—On the Nile..... | 386 |
| Water Carriers at Esneh, Egypt..... | 387 |
| Regulating Dam, Across Nile near Assiout, Egypt..... | 387 |
| Top of Assouan Dam, Egypt, During Construction..... | 388 |
| Temple on the Island of Philae, Submerged by Water Impounded by Assouan Dam..... | 389 |
| Entrance to Irrigation Canal, The Nile, Egypt..... | 389 |
| Gideon's Fountain, Palestine..... | 390 |
| Elisha's Fountain Near Old Jericho, Palestine..... | 391 |
| Rock Cistern, Jerusalem, Palestine..... | 392 |
| Pool of Siloam at Foot of Hezekiah's Tunnel, Palestine..... | 394 |
| Fountain—Mexico..... | 395 |
| Sacred Spring—Gaudelupe, Mexico..... | 396 |
| Ruins of Ancient Aqueduct, Ephesus, Asia Minor..... | 396 |
| Reservoir of the 1000 Columns, Constantinople..... | 397 |
| Ruins of Bath—Source of Water Supply for Modern Corinth..... | 398 |
| Old Roman Aqueduct, Italy..... | 398 |
| Street Fountain, Pompeii, Italy..... | 399 |
| House of Panza, Showing Front Court Fountain, Pompeii, Italy..... | 399 |
| Aqueducts, Genoa, Italy..... | 400 |
| Beginning of Great Aqueduct that Supplies Fountains at Versailles, France..... | 400 |
| One of the Great Fountains, Versailles, France..... | 402 |
| Concrete Collecting Slopes for Gibraltar's Water Supply..... | 402 |
| Disinfecting 200,000,000 Gallons of Water a Day: Torresdale Hypochlorite Plant Mixing and Solution Tanks..... | 404 |
| Torresdale Hypochlorite Plant Orifice Tank..... | 405 |
| Plan of Torresdale Filter Plant..... | 407 |
| Chart Showing Variation in Strength of Solution of Bleach..... | 413 |
| Liquid Chlorine Apparatus at Torresdale Filter Plant..... | 417 |
| Chlorine Feed Pipes, Torresdale Filter Plant..... | 418 |
| Liquid Chlorine Apparatus Belmont Filter Plant..... | 427 |
| Liquid Chlorine Apparatus Queen Lane Filter Plant..... | 430 |

A WANDERER'S NOTES ON FOREIGN WATER SUPPLIES—Continued

| | |
|--|-----|
| Liquid Chlorine Apparatus Upper Roxboro Filter Plant..... | 432 |
| Liquid Chlorine Apparatus Lower Roxboro Filter Plant..... | 433 |
| FIRE ALARM ATTACHMENT FOR RECORDING PRESSURE GAUGE | |
| Fire Alarm Attachment for Recording Pressure Gauge..... | 552 |
| Wire Connection for Fire Alarm Attachment..... | 553 |
| PURIFICATION OF WATER BY ULTRA-VIOLET RAYS | |
| Pistol Lamp..... | 579 |
| Luneville, France, Sterilizing Plant..... | 581 |
| EFFECT OF OZONE ON ALGAE GROWTHS | |
| Diagram Showing Arrangement of Ozone Generator, Absorption Bottle and Asperator..... | 631 |
| FORTY-EIGHT INCH CAST IRON FORCE MAIN FOR ATLANTIC CITY, N. J. | |
| Laying Concrete Bases for Pipe..... | 705 |
| Concrete Bases Ready for Pipe..... | 705 |
| Laying Pipe..... | 707 |
| Pipe as Complete..... | 707 |
| A CHEAP HOMEMADE TEST PLUG FOR WATER MAINS | |
| Diagram..... | 717 |
| LABORATORY CONTROL OF WATER SUPPLIES | |
| Laboratory in Iron Removal Plant of Champaign and Urbana Water Company..... | 721 |
| Laboratory of Cairo Water Company..... | 722 |
| Laboratory of Danville Water Company..... | 722 |
| Laboratory Built in Filter House, Pontiac..... | 723 |
| Office and Laboratory, Danville Water Company..... | 723 |
| Diagram Showing Chemicals Used and Number of Bacteria Found March 1913, Danville, Illinois..... | 724 |
| Plan of Small Laboratory and Detail of Table..... | 725 |
| Plan Showing Arrangement of Furniture in Small Water Works Labor- atory..... | 726 |



CLASSIFIED INDEX TO ADVERTISEMENTS

BRASS FITTINGS

| | |
|--|----|
| Bourbon Copper and Brass Works..... | 25 |
| Farnan Brass Works..... | 25 |
| Glauber Brass Manufacturing Company..... | 18 |

CHEMISTS

| | |
|-----------------------|----|
| Bull and Roberts..... | 30 |
| Caird, James M..... | 30 |

CHEMICALS

| | |
|--|----|
| General Chemical Company..... | 23 |
| Harrison Bros. & Co., Inc. | 26 |
| Jarecki Chemical Company, The..... | 23 |
| Pennsylvania Salt Manufacturing Company..... | 23 |
| United Lead Company..... | 23 |

ENGINEERS—CONTRACTING AND CONSULTING

| | |
|---------------------------|----|
| Alvord & Burdick..... | 29 |
| Clark, Wm. G..... | 30 |
| Conard, William R..... | 30 |
| Cook, A. D..... | 24 |
| Fuller, George W..... | 29 |
| Hering and Gregory..... | 30 |
| Hodgkins, Henry C..... | 30 |
| Kay, Edgar B..... | 30 |
| Maury, Dabney H..... | 30 |
| Metcalf and Eddy..... | 30 |
| Potter, Alexander..... | 29 |
| Weston, Edmund B..... | 30 |
| Weston, Robert Spurr..... | 30 |
| Witmer Company, J..... | 30 |

FILTERS AND FILTER SUPPLIES

| | |
|--|----|
| New York Continental Jewell Filtration Company, The..... | 7 |
| Pittsburgh Filter Manufacturing Company..... | 21 |
| Franklin H. Kalbfleisch Co..... | 25 |

FIRE HYDRANTS

| | |
|---------------------------|---|
| Columbian Iron Works..... | 8 |
|---------------------------|---|

METERS

| | |
|-----------------------------------|----|
| Buffalo Meter Company..... | 17 |
| Builders Iron Foundry..... | 11 |
| Hersey Manufacturing Company..... | 6 |
| National Meter Company..... | 14 |
| Neptune Meter Company..... | 15 |
| Pittsburgh Meter Company..... | 9 |
| Thomson Meter Company..... | 4 |
| Union Water Meter Company..... | 2 |

METER BOXES

| | |
|--------------------------|----|
| Clark Company, H. W..... | 20 |
|--------------------------|----|

CLASSIFIED INDEX TO ADVERTISEMENTS

ORGANIZATIONS

| | |
|--|----|
| American Society of Mechanical Engineers, The..... | 22 |
|--|----|

PIPE AND SPECIALS

| | |
|---|---------|
| American Pipe and Construction Company..... | 25 |
| United States Cast Iron Pipe and Foundry Company..... | 3 |
| R. D. Wood & Co..... | cover 4 |
| Standard Asphalt and Rubber Company..... | 29 |
| Warren Foundry and Machine Company..... | 18 |

PIPE CLEANING

| | |
|---|----|
| National Water Main Cleaning Company..... | 19 |
|---|----|

PUBLICATIONS

| | |
|---|----|
| American City, The..... | 13 |
| Canadian Engineer..... | 22 |
| Directory of the Water Works Companies and Water Departments of the United States..... | 27 |
| Engineering Magazine Company, The..... | 24 |
| Engineering News..... | 22 |
| Engineering Record..... | 16 |
| Fire and Water Engineering..... | 20 |
| McGraw Publishing Company..... | 28 |
| Municipal Journal..... | 22 |
| Public Service..... | 26 |
| Water and Gas Review..... | 21 |

PUMPING ENGINES

| | |
|------------------------|----|
| Foster and Hosler..... | 12 |
|------------------------|----|

STEEL TANKS

| | |
|------------------------------------|----|
| Chicago Bridge and Iron Works..... | 24 |
|------------------------------------|----|

VALVES

| | |
|---|----|
| Golden-Anderson Valve Specialty Company..... | 5 |
| Kennedy Valve Manufacturing Company, The..... | 20 |
| Ludlow Valve Manufacturing Company, The..... | 19 |
| Ross Valve Manufacturing Company..... | 24 |
| S. E. T. Valve and Hydrant Company..... | 21 |

WATER TAPPING MACHINERY

| | |
|--|----|
| Mueller Manufacturing Company, H..... | 10 |
| Smith Manufacturing Company, The A. P..... | 1 |